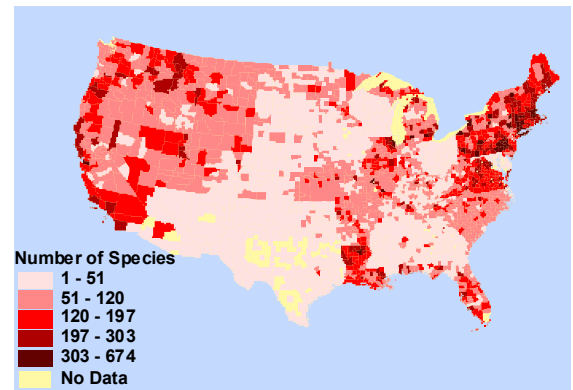


## FORT COLLINS SCIENCE CENTER INVASIVES SPECIES SCIENCE

### CAPABILITIES

Invasive, non-native species of plants, animals, and disease organisms adversely affect the ecosystems they enter. Like “biological wildfires,” they can quickly spread and affect nearly all terrestrial and aquatic ecosystems. Invasive species have become the greatest environmental challenge of the 21st century in terms of economic, environmental, and human health costs, with an estimated impact in the U.S. of over \$138 billion per year. Managers on Department of the Interior and other public lands, as well as the private sector, rank invasive species as their top resource management problem.



The Invasive Species Science Program of the Fort Collins Science Center (FORT) provides research and technical assistance relating to invasive species management concerns, including understanding how these species are introduced, identifying vulnerable areas, forecasting invasions, and developing control methods. To disseminate this information, FORT scientists are developing the Invasive Species Information Node of the National Biological Information Infrastructure (NBII), a comprehensive, accessible database of invasive species of plants, animals, and disease agents. From these data, and in partnership with Colorado State University, the National Aeronautic Space Administration (NASA), and others, FORT scientists are constructing models to understand and predict invasive species behavior for more effective management. FORT is also the administrative home of the *National Institute of Invasive Species Science*, a growing consortium of partnerships between government and non-government organizations established by the U.S. Geological Survey (USGS) and its many cooperators.

### SELECTED PROJECTS

**Wildfire, Fuel Treatments, and Non-Native Plant Species.** Increasingly, public land managers are faced with having to protect natural places and processes along with residents of the wildland-urban interface, where these twin mandates can collide. In collaboration with the Western Forest Fire Research Center at Colorado State University, FORT scientists are conducting research to provide these managers with information that is applicable both ecologically and socially to pre- and post-fire management decisions. Avenues of investigation include the effectiveness of pre-wildfire fuel reduction treatments on reducing post-fire burn severity; the effects of wildfire on native and non-native plant species; and the interaction between seeded species and native plant species.





**National Wildlife Refuge Invasive Species Inventory.** The U.S. Fish and Wildlife Service (USFWS) manages over 500 national wildlife refuges, encompassing nearly 93 million acres and representing every major ecosystem type in the U.S. All are experiencing non-native plant invasions that threaten the refuges' ability to fulfill their conservation mission. A cooperative study between the USGS and the USFWS entails developing and implementing a system for gathering invasive species information from all refuges and coordinating that data for managers from local to national levels. With this synthesized information and the NBII Invasive Species database, managers will be able to prioritize control efforts for non-native species already present on their refuges. In addition, they will be able to track other non-native species in their vicinities, so they will know which species to watch for and attempt to eradicate before they become well-established.

**Predictive Modeling for Invasive Plants.** Invasive plant species pose a major threat to the integrity of native plant communities, often threatening rare and endangered plant species as well. Predicting invasive plant behavior in vulnerable areas is key to controlling them. FORT and NASA scientists have initiated a three-year cooperative agreement with colleagues at Colorado State University to substantially improve predictive modeling capabilities for invasive plant species. In February 2002, scientists began combining new rapid spatial analysis techniques with high-performance computing capabilities for broad applications in "ecological forecasting" of the invasion process. Funded by the Computational Technologies Program at NASA's Goddard Space Flight Center, the study's test data sets will focus on, and immediately benefit, Rocky Mountain National Park, Grand Staircase-Escalante National Monument, and areas burned in the Cerro Grande Fire in the Santa Fe National Forest, New Mexico.



**Brown Treesnake.** The brown treesnake is responsible for the extirpation of nearly all native bird species and most bats and lizards on Guam. It also exacts between \$1 and 4 million per year in damages, including frequent power outages. Keeping this voracious snake from other non-infested islands, such as Hawaii and the Northern Marianas, is a top priority for the Department of the Interior's Office of Insular Affairs. In cooperation with other federal, state, and island agencies, FORT scientists working in Guam are making progress in toxicant research, trapping, population biology, venom research, and control strategies. In early 2002, they formed a rapid response team to address potential brown treesnake sightings in the Pacific. Based in Guam, this interagency team includes trained brown treesnake "searchers." When local authorities request the team's services, they quickly travel to the sighting location and use all available tools, in cooperation with local counterparts, to capture the snake or limit an infestation.

**Establishing an Invasive Species Information Node of the NBII.** Working with NASA, the NBII, the Natural Resource Ecology Laboratory at Colorado State University, the Biota of North America Program (BONAP), several USGS Science Centers, and many others, FORT scientists and cooperators are developing a system for coordinating multiple types of data on both native and invasive non-native

species across the U.S. This information will be accessible over the World Wide Web in conjunction with analysis tools that will allow the user to, among other applications, summarize data for an area, query surrounding areas to determine what non-natives are encroaching, and even model where current non-native species are likely to be located. Currently, a demonstration site is being developed using vegetation data from Colorado.



## STAFF

### ***Science Director – Tom Stohlgren***

Ph.D. Ecologist: invasive species science, forest ecology, sampling techniques and design, resource inventory and monitoring, global change, grazing impacts, biodiversity.

Chong, Geneva, Ph.D. Ecologist: non-native and invasive species; landscape, plant, and fire ecology.

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Fritts, Thomas, Ph.D. Research Wildlife Biologist: evolution and ecology of reptiles and amphibians; arid, montane, and insular ecology.

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Rodda, Gordon, Ph.D. Research Zoologist: behavior and population biology of reptiles and amphibians; brown treesnakes; introduced species and islands.

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FORT Online provides information about FORT projects, scientists, publications and other products, science features, and much more.

Visit the FORT website at <http://www.fort.usgs.gov>

Learn more about the  
Invasive Species Science Program at  
<http://www.fort.usgs.gov/research/100/100.asp>